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# THOMAS HOBBES AND THOMAS WHITE ON IDENTITY AND DISCONTINUOUS EXISTENCE

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**Abstract:** Is it possible for an individual that has gone out of being to come back into being again? The English Aristotelian, Thomas White, argued that it is not. Thomas Hobbes disagreed and used the case of the Ship of Theseus to argue that individuals that have gone out of being may come back into being again. This paper provides the first systematic account of their arguments. It is doubtful that Hobbes has a consistent case against White. Still, his criticism may have prompted White to clarify his views on identity over time in his later work.

## 1. Introduction

Suppose  $x$  at  $t_1$  is the same individual as  $y$  at  $t_2$ . Does this entail that this individual has continuously existed between these two moments of time? Or could it have gone out of being some time after  $t_1$  to come back into being again some time before  $t_2$ ?

According to many early modern philosophers, the latter is at least a supernatural possibility. God can bring it about that at some moment after an individual had ceased to be, that same individual comes into being again a second time. But is it a natural possibility too? In the natural course of events, is it possible for an individual to go out of being at one time and then to come back into being at a later time? In this paper, we study the debate on

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this question that ensued between Thomas Hobbes and his friend and correspondent, Thomas White.<sup>1</sup>

The philosophy of Thomas White is perhaps best described as a systematic attempt to reconcile Aristotelian tradition with the best of the new philosophy of the seventeenth century.<sup>2</sup> The work that we will concentrate on here are his 1642 dialogues *De mundo*, the work that prompted Hobbes to write his first book-length treatise on natural philosophy. This treatise, which remained unpublished during his lifetime, is best known today as *De Mundo Examined*.<sup>3</sup> It reveals the deep disagreement between the two thinkers on a wide range of topics, including the question of whether or not it is possible for an individual that has ceased to be to come back into being a second time.

According to White, the answer to this question was no. As nature only ever produces the same effect once, no individual that has once gone out of being will ever come back into being again.<sup>4</sup> Hobbes disagreed. Using a version of the traditional puzzle of the Ship of Theseus to build his case, he argued that it is possible at least for certain individuals to go out of being at one time and then to come back into being at a later time. In this paper, we provide the first systematic account of this disagreement between White and Hobbes. We argue that Hobbes's case against White suffers from an internal tension and suggest that, in spite of this, Hobbes's criticism may have prompted White to clarify his views on identity over time in his later work.<sup>5</sup>

The paper proceeds as follows. Sections 2 and 3 discuss two arguments from *De mundo* against the possibility of nature producing the same effect more than once. The first argument we will refer to as the probabilistic argument. As we will see, White in the dialogues lets his spokesman reject this argument. Still, it merits close attention as an early attempt to apply probabilistic reasoning to a metaphysical problem. The second argument, which we will refer to as the causal argument, concludes that the reproduction of an effect after it has ceased to be is precluded by the way in which effects depend on their causal origins. Section 4 outlines the account of individuation Hobbes builds on in his criticism of White. Sections 5 and 6 turn to Hobbes's discussion of the Ship of Theseus to show how he arrives at the conclusion that at least some individuals are capable of coming into being more than once. Section 7 looks at the account of identity over time White outlines in his 1646 *Institutiones peripateticae*.<sup>6</sup>

## 2. The probabilistic argument

*De mundo* stages the philosophical conversations of three friends on their journey to the city of Reims: Andabata, an Aristotelian steeped in scholastic learning; Ereunius, a modernizing Aristotelian serving as a spokesman for

White in the dialogues; and Asphalius, a neutral third party, who more often than not ends up on the side of Ereunius's more modern views.<sup>7</sup>

One of the problems the three friends address is the problem of whether or not it is possible for the same individual effect to come about more than once. Asphalius claims that it is not. To defend his claim, he begins by introducing his friends to a game of dice. A cast in this game is defined as a simultaneous roll of a number of fair dice. A success is defined as a case where sixes turn up on all of the dice in a cast.

This game has at least the following properties. First, no matter the number of dice in a cast, only one out of the possible outcomes of the cast will count as a success. Second, the higher the number of dice in a cast, the higher the number of possible outcomes of the cast. A third property follows from these two. The higher the number of dice in a single cast, the lower the probability of success.

Having introduced this game, Asphalius proceeds as follows:

*Asphal.* When the game is played with three dice, a success will be found in a certain number of casts, each with an uncertain outcome. The same will happen when the game is played with six dice, but a repeated success will occur much less often in this case, and in this way the rarity of any given outcome increases according to a certain law (*DM* 108).<sup>8</sup>

A repeated success is a case where a set of dice is cast a number of times in a row, and this series of casts yields more than one success. The claim Asphalius appears to make about repeated success so understood is the following. The lower the probability of success in a single cast of a set of dice, the lower also the probability of more than one success in any finite series of casts of the set of dice.

This claim is correct. The probability of success in a single cast of six dice is lower than the probability of success in a single cast of three dice. Hence, the probability that more than one success is found in a series of  $n$  casts of six dice is lower than the probability that more than one success is found in a series of  $n$  casts of three dice as well.<sup>9</sup>

But while these claims are hardly surprising in their own right, what is surprising is what Asphalius believes his observations about a simple game of dice can teach us about the metaphysics of finding the same effect more than once. According to Asphalius, indeed, what the foregoing observations about the chances of success in a game of dice go to show, is that it is impossible for natural causes to produce the same effect more than once.

## 2.1. FROM DICE TO NATURE

Immediately after the above passage on repeated success in a game of dice, Asphalius proceeds as follows:

*Asphal.* Now in the nature of concurrent causes, I see an absolute and perfect infinity. For even though the number of counted causes is bounded by a certain number that is fairly easily grasped, yet by the application of one cause to another, I see infinite multitudes opening up.

For let a piece of wood be divided by an axe, or let wine be poured into a glass. Looking at the agent and the matter involved, I see that neither of them commands some determinate outcome, but that, as a result of the capacity for division of both materials, the portion of wine or wood that will result from the act of division is picked out by lot from infinitely many possibilities.

If, then, it is necessary that, the larger the variety of contingencies, the rarer the some given effect occurs, likewise it is necessary that, where the multitude of contingencies exceeds all number, the same effect cannot return (*DM* 108–109, paragraphs added).

How are we to understand this argument? According to Hobbes, the point *Asphalius* is making in the first paragraph is that, for every natural effect, there is an infinite number of causes leading up to that effect. To be sure, the number of immediate causes leading up to any given effect is finite, but if we include these causes' causes, and their causes, and so on, there will be no end to the total number of items in our causal chain:

Because a given effect has many immediate causes, and each of these at its turn has several causes, and the number of causes is continuously multiplied in this way, he concludes that this effect in the end will have an infinite number of causes (*DME* 192).

Hobbes then goes on to criticize the argument by pointing out that, even though the causal chain leading up to some given effect may well be very long, there will always be an end to the number of items that can be strung together in a causal chain: 'in a finite world, it is impossible for the number of causes to proceed to infinity' (*DME* 193).

We claim that Hobbes has misunderstood *Asphalius* here, for two reasons. First, later on in the dialogue, *Asphalius* clearly accepts that the causal series leading up to some given effect may be long but will always be finite.<sup>10</sup> Second, if Hobbes's reading were correct, the examples that *Asphalius* goes on to give would make little sense. This is perhaps clearest in the case of the piece of wood that is divided by means of an axe. In this case, *Asphalius* appears to recognize the wood as a material cause and the axe as an efficient cause. But no effort is made at this point to elevate the number of causes involved in the division of the wood beyond these two.

So how are we to read the argument? We propose the following. In the first paragraph, *Asphalius* tells us that natural effects are produced by a finite number of causal agents. However, given the nature of these causal agents, the effects they actually produce are not the only ones that could have come about. On the contrary, given the nature of these causal agents, there are infinitely many effects that could have resulted.<sup>11</sup>

This point is then illustrated in the second paragraph. In the division of a piece of wood by means of an axe, two causal agents are involved: the wood, which serves as a material cause for the division, and the axe, which serves as an efficient cause. But finite in number as these causal agents may be, they allow for an infinite number of ways to divide the wood. The surface of the wood provides an infinite number of lines along which the wood may be cut, and the axe has the ability to cut the wood along any of these lines. Thus, (1) the way in which the piece of wood is in fact divided is but one out of infinitely many ways in which it could have been divided. We are also told that the wood and the axe are indifferent to any particular outcome and that the way the wood ends up being divided is determined by lot. In other words, (2) each possible division of the wood has the same probability of coming about. This, indeed, seems to be the connection Asphalius sees between the argument here and the observations on success in a game of dice that immediately precede it: Obtaining any given division of the wood is a bit like getting some given outcome on a die with infinitely many faces.

In the first lines of the last paragraph, we seem to be reminded of a fact about games of dice: As the number of possible outcomes with an equal probability becomes larger, the probability of obtaining any one of these outcomes becomes proportionally smaller. Applied to the case of the piece of wood, where we have an infinitely large number of equally probable possible outcomes, this means that (3) every possible division has an infinitely small probability of coming about. What the final lines appear to say is that, as a result of this, (4) it is infinitely improbable for one and the same division to be found more than once. Hence, even if, after it has been divided, the wood could somehow be made whole again to be subjected to division again, (5) the same division that was found the first time cannot possibly return. In other words, a natural effect such as the division of a piece of wood along a certain line cannot come about more than once.

Before we turn to Hobbes and his criticism of the probabilistic argument, it is important to appreciate the ontological import the example here would have had for White. White was committed to what has come to be known as the potential parts theory.<sup>12</sup> His version of that theory says that, given a whole that is divisible into parts, the only actual being is the whole. The parts into which it can be divided are but potential beings, which become actual only when the whole is in fact divided. For White then, to divide a piece of wood into two parts is not to pick out two individual parts that were actually there already, but to give actual being to two individuals that, up to that point, were potential beings only. Against this background, the probabilistic argument concludes, not only that one and the same division of a piece of wood cannot return a second time but also that, no matter how often the same piece of wood is subjected to division, the same two parts cannot be actualized more than once.

## 2.2. HOBBS ON THE PROBABILISTIC ARGUMENT

How are we to evaluate this argument? Asphalius is entitled to the conclusion that the probability of finding the same division two times in a row is infinitely small or indeed that the probability of finding the same division more than once in any finite series of divisions of the wood is infinitely small.

The conclusion that Asphalius is after, however, is that it is impossible to obtain the same division more than once. And this conclusion, Hobbes claims, is not one that the probabilistic argument will license:

If effects are obtained the same way as sixes on a die., the same effect that is produced one time can again be produced another time, just as, no matter the number of dice on which sixes turn up, the same sixes can turn up again in another cast (*DME* 192).

Hobbes reasons as follows. Suppose that Asphalius is correct and that obtaining a certain division is indeed like casting a die, perhaps a die with infinitely many faces. It will follow from this that any two divisions of the wood will be independent events. Thus, if a division of the wood has a certain probability of coming about before the wood is divided the first time, it will have the same probability of coming about when it is divided a second time.

Now to be sure, Asphalius believes that the probability of obtaining this division is infinitely small. But this does not entitle him to the conclusion that it cannot be obtained when the wood is divided a second time. After all, his whole discussion is premised on the idea that effects that are infinitely unlikely to come about can come about and in fact do come about on a regular basis.<sup>13</sup>

This is a fair criticism of the probabilistic argument. But it hardly is fair criticism of *White*. For what Hobbes fails to mention is that *White* has his spokesman in the dialogues make very much the same point. According to Ereunius, indeed, if the wood and the axe are indifferent to any particular outcome before the wood is divided the first time, they will again be indifferent to any particular outcome when it is divided a second time. Thus, when the wood is divided a second time, each outcome will again have the same probability of being found as the first time, including the outcome that was in fact found the first time. Granted, the probability that this outcome is obtained will be infinitely small. But then, this is the case for all possible outcomes. Yet even though each outcome is infinitely improbable, some one of them will become actual once the axe is dropped. Infinite improbability as understood in the probabilistic argument does not amount to impossibility:

*Ereu.* You reason subtly, Asphalius, and in a way that befits your intellect. But what if someone were to respond that the causes have not changed in any way just because they have produced this effect once, and that, therefore, the causes are just as indifferent as they were before, so that the same division could well be made after it has been made the first time? And if you appeal to

the infinity contained in the causes, the objector could say that this infinity is the same with regard to this effect as to any other, and that, yet, you will not deny that some determinate effect will come about (*DM* 109).

In his response, Asphalius appears to accept that it may be improbable, but not impossible, for a piece of wood to be divided along the exact same line twice. However, he also insists that if this were to happen, the division that so resulted would be the same in kind as the one obtained the first time, but not the same in number. The reason for this is that the complete causal history of the division obtained the second time would not be the same as the complete causal history of the division obtained the first time. Indeed, his response to Ereunius in the above passage is as follows:

*Asphal.* I would counter that the causes have changed (*DM* 109).

But what precisely is the connection between causal history and numerical identity of effects Asphalius here relies on? To see this, we need to turn to what we may call the causal argument against the repeated occurrence of one and the same effect.

### 3. *The causal argument*

The causal argument is introduced in the dialogues as follows:

*Ereu.* A certain effect has been elicited from infinitely many possibilities by means of the present causes. But if one of these causes had been missing, it would not have been the same effect.

*Asphal.* So it is.

*Ereu.* But this cause, too, has been obtained from infinitely many possibilities by means of the joint work of all of its causes, so that if one of these had been missing, neither this cause, nor the effect mentioned earlier would have been produced. And if we go on in this way, there will be no end until we have woven a thread of Ariadne leading to the first causes, or to the first bodies, if any bodies have been made by God directly.

*Asphal.* That is correct (*DM* 112).

In these paragraphs, we find two ideas. The first is that for any effect *e*, there is a causal series leading from the first natural causes to it. The second is that *e* necessarily depends on this causal series. An effect produced by any other causal series will not be *e*.

How does this rule out that one and the same effect could be produced twice in history? For this, it seems we need a premise that, once *e* is first produced, no future effect will be produced by the same causal series as it. Ereunius offers no explicit argument for this premise, but the following passage seems to provide a clue as to why he might have accepted it<sup>14</sup>:

*Ereu*. There is no effect, however so small, be it the floating of a feather in the air, or the division of a tiny bit of dust, that does not depend on all of the single bodies of this corporeal machine of the universe, whether it be as a cause or as an effect, and likewise all these things depend on this effect in such a way that, without it, all things would be different, and be different individuals (*DM* 113).

In this passage, we find three ideas. The first is that the world is a fully connected causal system, to the extent that the causal series leading from the first causes to *e* will include the complete state of the world the moment it is produced.

The second is that, given that *e* necessarily depends on the causal series that produces it, and given that this causal series includes the complete state of the world the moment it is produced, *e* necessarily depends on the complete state of the world the moment it is produced. This also seems to be what Asphalius had in mind a few pages earlier, when he claimed that ‘an individual depends on the mathematical unity of circumstances’ under which it comes into being (*DM* 111).

The third idea is that, once *e* has first been produced, all future effects will have *e* at some more or less remote place in the causal series leading to them. And this suggests the following line of reasoning. Surely, *e* is not a part of the causal series first leading to *e*. Hence, once *e* has first been produced, no effect posterior to it will be produced by the same causal series as it.

At this point, we may raise two problems for the causal argument. The first is that, even if the above argument that no effect posterior to *e* will be produced by the same causal series as it may have been available to Ereunius, it is not clear to what degree he indeed avails himself of it. The argument for the most part remains implicit in the text. The second is that Ereunius does little to defend his claim that effects necessarily depend on their causal origins. To be sure, this view may well be defensible in certain cases.<sup>15</sup> It could be argued, for instance, that a footprint produced by me necessarily depends on me.<sup>16</sup> But note that the view Ereunius has in mind goes well beyond this modest proposal.

Indeed, according to Ereunius, because a footprint is caused in some way by the entire state of the world the moment it is produced, it necessarily depends on the entire state of the world the moment it is produced. Part of what this means is that this footprint necessarily depends on a tiny bit of dust ten miles away. Also, assuming that at no two seconds in a row is the world in the exact same state, the same footprint produced now could not have been produced even one second later. Again, there may well be a case to be made for accepting these and similar outcomes.<sup>17</sup> The problem is that, in the dialogues, Ereunius does not pause to note that these are in fact among the implications of his view and that he does little to convince his audience that they must be accepted.



As we will see in the next sections, however, Hobbes's strategy in arguing against White was not to target his causal argument directly. Rather, his strategy was first to draw the outlines of his own account of identity over time, and then to present a version of the ancient puzzle of the Ship of Theseus with the partial aim of providing a concrete example of an individual capable of coming back into being after it has once gone out of being. The following two sections will follow this order and provide an evaluation of the way in which Hobbes develops his example.

#### 4. *Hobbes on identity over time*

In order to assess the possibility or impossibility of the same individual existing more than once, Hobbes argues, it is necessary first to provide a general account of individuation.

Hobbes begins his discussion with a brief review of what he takes to be some traditional accounts of individuation.<sup>18</sup> The first of these says that objects are individuated by the total sum of their accidental features. But Hobbes has little patience for this account. If objects were individuated by the total sum of their accidents, no individual would survive even the smallest mutation, an outcome Hobbes finds incredible. According to the second account of individuation, objects are individuated by their matter. An account along these lines may be plausible in some cases, Hobbes grants. Thus, it would seem that a piece of wax continues to be the same individual only if it continues to be composed of the same matter. According to third account, objects are individuated by their form. This seems plausible in the case of organic bodies, which are subject to constant change on the level of their material parts, but continue to be the same individuals in virtue of their forms.

But if matter looks compelling as an account of individuation in some cases and form in others, how do we know which account of individuation to apply in which case? According to Hobbes, when asking of two temporally distant objects whether or not they are the same, it is crucial to take into account by what noun these objects are picked out. According to Hobbes, there are three basic kinds of nouns we use to pick out the objects around us. Depending on which of these kinds of nouns we use, different criteria of identity apply:

The name of some given body is either very general, such as *body*, entity, matter or substance, or restricted and determined in terms of some feature in virtue of which it is distinguished from some other body, such as *wax*, *ship*, *river*, *man*. The general names pick out a certain and determinate portion of matter. Of the restricted ones, some pick out a determinate portion of matter in terms of one or more of its qualities, such as *wax*. Others pick it out in such a way as to determine its form without any consideration for the matter except insofar as it is needed for the form, such as *ship* (*DME* 189).

Suppose  $x$  is described as a body. According to Hobbes, a body is identical to its parts, so that to describe  $x$  as a body is to describe it as a collection of parts.<sup>19</sup> Hence, given  $x$  and some temporally distant object  $y$ , it follows that

A.  $x$  is identical with  $y$  if and only if  $x$  and  $y$  share the same material parts.

The fact that identity of parts is necessary for identity with  $x$  means that even the smallest loss or gain of matter will make the object  $y$  that so results non-identical with  $x$ : 'no body can be the same as it unless all of its parts are the same, because the parts taken together are the same as the whole' (*DME* 190).<sup>20</sup> But the fact that identity of parts is sufficient for identity with  $x$  also means that  $x$  will be able to survive even drastic changes to the organization of its parts. Indeed,  $x$  will persist for as long as its parts do, no matter how they may have been rearranged or dispersed:

The same individual remains as long as the same matter does. Thus the water that was in the sea is the same as the water that is later found in the skies, and it always remains the same body, be its parts conjoined or dispersed, be it in a solid or in a liquid state (*DC* 11.7).<sup>21</sup>

Now if  $x$  just is the collection of its material parts, it also follows that  $x$  is incapable of going out of existence. For according to Hobbes, as long as nature takes its ordinary course, the material parts that compose  $x$  may undergo countlessly many spatial re-arrangements, but will never go out of existence. Hence, barring a divine intervention, objects described as bodies or collections of material parts will never cease to be: 'a body is not capable of generation or corruption, even though it can appear to us in various ways, and so go under various names' (*DC* 8.20). Therefore, if  $x$  is described as a body, it is impossible for it to go out of existence and then to come back into existence again. After all, as Hobbes explains, in order for a body to return, 'that is, to come into existence again, it is necessary that it first went out of existence' (*DME* 191).

Matters look different, however, if  $x$  is described as a piece of wax. When we describe it as a piece of wax, we describe it as a certain portion of matter endowed with a certain kind of accident, such as having a certain figure or colour.<sup>22</sup> According to Hobbes:

When a name is imposed on the basis of some accident, identity will depend on the identity of its matter (*DC* 8.2).

For  $x$  and  $y$  to be the same then, it is necessary that they be the same portions of matter. But sameness of matter does not seem to be sufficient. In order for  $y$  to be the same as  $x$ , it seems the matter of  $y$  must also realize the accident on the basis of which  $x$  was picked out. So for  $x$  described as a portion of matter endowed with some accident  $F$ , it seems we have:

- B.  $x$  is identical with  $y$  if and only if the matter of  $y$  is the matter of  $x$  and realizes F.

Now it appears that, described in this way,  $x$  is capable of going out of existence and then coming back into existence again. It is capable of going out of existence because, even if the matter of  $x$  cannot naturally cease to be, it can cease to realize F. And it is capable of coming back into existence again, because after the matter of  $x$  has ceased to realize F, it can come to do so again.

If  $x$  is described as a river, Hobbes claims, it is described as an object with a certain form, or as an object that retains an identity over time for as long as it retains the same form. But when is it the case that two temporally distant objects have the same form? Hobbes offers no official answer, but does provide some examples of objects that remain the same over time because they retain the same form. Thus, we are told that, as water flows in and out, a river does not remain the same body over time, but that, still,

it is the same river, because it is called one river on the basis of the unity of the flow of water, which is one continuous motion. Hence whenever this motion or flow is one and the same, the river will be one and the same as well (*DME* 190).<sup>23</sup>

Again:

If it is asked if an old man is the same being or body in number as a young man, it is clear that, because of the continuous loss and gain of matter, he is not the same in matter and so is not the same body, but that because of the unity of the flow in which matter is shed and newly integrated, he always is the same man (*DME* 190–191).

Finally, changes in population and the construction of new buildings prevent a city from remaining the same body, or entity, over time, but as long as there is a ‘continuous order and motion’ in its government, it does remain the same city (*DME* 191).

What these examples suggest is that for  $x$  and  $y$  to share the same form, it is necessary that  $y$  be continuous with  $x$ . More precisely, the examples suggest that  $y$  needs to be continuous with  $x$  in the sense that  $y$  develops from  $x$  along a path that is continuous in space and time, and in such a way that the beginning and end point of each phase in this development constitute an individual of the same species. With this concept of continuity in place, we may capture what Hobbes has in mind as follows. Given an individual  $x$  described as having a form F,

- C.  $x$  is identical with  $y$  only if  $x$  and  $y$  are F-continuous.

On the basis of this condition, it appears that, described as an object bearing a certain form,  $x$  is incapable of going out of being and then coming back

into being again at a later time. For once,  $x$  has gone out of being, no individual  $y$  coming into being after that event will be continuous with, and hence, the same individual as,  $x$ .

### 5. *The ship of Theseus*

Having provided the outlines of a theory of individuation, Hobbes turns to a version of the ancient puzzle of the ship of Theseus. This version is as follows. Call the ship on which Theseus departs, Original. On the first day of his journey, one plank of Original is cast overboard to be replaced by a new one.<sup>24</sup> The same happens to another plank on the second day, and this process repeats itself until, at some point, every single part of Original has been renewed. Call the ship that so results Replacement. Now as it happens, all of the parts of Original that are cast overboard for renewal wash ashore at the same place, where a maritime engineer collects them and puts them together again according to the original plan. Call the ship that so results Reassembly.<sup>25</sup>

The puzzle we now face is that both Replacement and Reassembly seem to have some claim on identity with Original. But the problem is that if we granted both

Original = Replacement, and  
Original = Reassembly,

it would follow, by transitivity of identity, that

Replacement = Reassembly.

But surely, the ship on the shore cannot be identical with the ship at sea, or we would have ‘two ships the same in number, so that two and one would be the same, which is impossible’ (DME 190). So how does Hobbes avoid ship-bilocation?

When Hobbes writes that, in making claims about identity it matters how the objects compared are described, some commentators interpret this as a commitment to the relative identity thesis.<sup>26</sup> This is the thesis that statements of the form  $x = y$  are somehow incomplete and that, properly speaking, all judgments of identity are of the form:

$x$  is the same  $F$  as  $y$ ,

where  $F$  is a noun supplying a criterion of identity for  $x$  and  $y$ . On this reading, Hobbes would also accept that  $x$  and  $y$  could be the same relative to

some, but not to other ways of describing them<sup>27</sup> so that there could be true statements of the following form<sup>28</sup>:

$x$  is the same  $F$  as  $y$ , but not the same  $G$ .

According to some commentators who read Hobbes in this way, he also uses the relativity of identity to deal with the conflicting claims of Replacement and Reassembly on identity with Original:

Which of the two ships is the same as the original one? Finally, Hobbes embraces an idea of relative identity, according to which some bodies can be considered as identical or non-identical according to the descriptions ('names') under which we refer to them (Di Bella 2005, p. 118).

Here the idea appears to be that, if Hobbes accepted that Original and Replacement are continuous and that Original and Reassembly are not, he could say the following:

1. Original is the same ship as Replacement, but not the same body.
2. Original is the same body as Reassembly, but not the same ship.

Thus justice could be done to the fact that both Replacement and Reassembly appear to have some claim to identity with Original. But transitivity of identity would not apply, because the sameness relation between Original and Replacement in (1) would not be the same as the sameness relation between Original and Reassembly (2).

In what follows, we will not dispute that, according to Hobbes, is possible for some given  $x$  and  $y$  to be the same ship but not the same body, or the same body but not the same ship. As we will see, however, there is no evidence that he ever endorsed the specific cases of (1) and (2), or that he used these to deal with the conflicting claims of Replacement and Reassembly on identity with Original.

### 5.1. HOBBS'S SOLUTION

In *De Mundo Examined*, Hobbes deals with the conflicting claims of Replacement and Reassembly on identity with Original in two central passages. Passage 1 is as follows:

Because the word 'ship' designates a form, surely as long as it is able to sail, a ship will remain. Indeed the same ship will remain, because the ship that was before is never destroyed. However, if a part of the ship is removed so that it is no longer able to sail, what remains will not be a ship at all, let alone the same ship. Hence if another plank is substituted for the one that has been removed, the result will be that a different ship-form is imposed on different matter, as the first has ceased to exist. From this matter, which is no longer the same, a ship will be obtained that is not the same in number, but the same in kind (*DME* 190).

Hobbes here reasons as follows. An object is a ship only if it is able to sail. In order for an object to be able to sail, it is essential that it have certain parts. Let the rudder be such a part. Now assume that, at some moment of time, the rudder of ship *x* is removed to be replaced by a new one a few moments later. By removing the old rudder from *x*, we obtain an object that is not able to sail and so does not constitute a ship. By adding the new rudder, we obtain an object *y* that is able to sail and so again constitutes a ship. But *y* will not be the same ship as *x*. The reason for this is that, as we are reminded in the opening line of the passage, ships are individuated by form. And that means that, in order for *x* to be the same individual as *y*, they would have to be ship-continuous. But they are not. For in some phase of the development of *x* into *y*, what we had was an object unable to sail.<sup>29</sup>

It follows from this that (1) may well be false. In a scenario where at some point on the way from Original to Replacement the sailors remove the rudder or a similarly essential part, Original and Replacement would not be the same ship. We would then have:

- 1'. Replacement is neither the same body nor the same ship as Original.

That Hobbes denies (2) is clear from Passage 2:

Can, for instance, any existing ship, if it ceases to be a ship, be made a ship again, and the same in number as existed before? I do not see why this cannot be done. If someone were to take apart an existing ship, it would cease to be a ship. But if someone puts together again the disjoint planks as they were before, using the same nails, this ship will have numerically the same matter as it had before, and it will again be a ship. And a ship that is made of the same matter in number certainly is the same ship (*DME* 191).

Here we are told that, if two temporally distant objects are ships made out of the same matter arranged in the same way, they will be the same ship. This is true of Original and Reassembly. Hence Original and Reassembly are the same ship. So we have:

- 2'. Reassembly is the same body as well as the same ship as Original.

Together, the above two passages give Hobbes a possible scenario where Original has gone out of existence at some moment before all of its parts have washed ashore, and where Original then comes back into being as Reassembly. In this scenario, worries about bilocation do not arise, as Replacement has ceased to be a contender for being the same ship as Original. As we are about to see, however, the above two passages give rise to at least two problems for Hobbes.

## 5.2. PROBLEMS FOR HOBBS

The first problem is that, possible as it may well be for the ship-history between Original and Replacement to be discontinued by the renewal of an essential part, it hardly seems necessary. Indeed, if the rudder were replaced part by part, it seems that Original and Replacement could very well be ship-continuous, again giving Replacement a claim to being the same ship as Original.<sup>30</sup> In other words, Hobbes may have shown that it is possible for Original to regenerate as Reassembly without being bilocated. But he has not ruled out that, at some moment in time, we may find more than one object with a claim on being the same ship as Original.

The second problem is that the above two passages appear to make incompatible claims about what is necessary for sameness of ship over time. In Passage 1, Hobbes assumes that sameness of form and hence continuity are necessary for sameness of ship. But in Passage 2, he assumes that two temporally distant ships will be the same if they are the same portions of matter arranged in the same way regardless of their continuity or discontinuity, and hence regardless of sameness of form. Indeed, Passage 2 above continues as follows:

Given the same matter, the fact that the same form in number has not returned does not make it the case that the ship is another one (*DME* 191).

One way to capture what happens here, is to say that Hobbes oscillates between two views on ship identity over time. In Passage 1, he draws on criterion C associated with objects individuated by form to show that Original and Replacement may not be the same ship. But in Passage 2, he appears to draw on criterion B, whereby any object made of the same matter and having the same shape as the ship on which Theseus commenced his journey will be the same ship as Original.

Now someone might try to rescue Hobbes from inconsistency here by arguing that he is actually applying a kind of hybrid criterion along the following lines: *x* and *y* are the same ship if and only if:

- D. They share the same form, *or* they are ships made of the same matter arranged in the same way.

On this reading, when Hobbes says that Replacement must share the same form as Original to be the same ship as it, he is reasoning that, since Replacement will never meet the second disjunct of D, it must meet the first if it is to have any chance of being the same ship as Original. When he says that Original and Reassembly are the same ship in spite of their difference in form, he is reasoning that, even if they do not meet the first disjunct of D, they do meet the second.

The problem with a reading along these lines, however, is that nowhere in the text does Hobbes hint towards such a hybrid criterion. On the contrary, we are consistently given the impression that there are three, not four, ways to identify objects over time, and that to describe an object as a ship is to 'designate a form', or to pick out a referent 'in such a way as to determine its form'. All of this makes it hard to see that Hobbes has provided an internally consistent scenario where Original ceases to exist and then comes back into being as Reassembly. Indeed, Hobbes himself may have grown dissatisfied with his treatment of the Ship of Theseus in the response to White, as in the later *De corpore* we find a notably different account of ship-identity over time in general and of the Ship of Theseus in particular. The next two sections will turn to this account, and ask whether it provides Hobbes with an example of an object capable of coming into being more than once that would convince White.

### 6. *The ship of Theseus revisited*

In the chapter On Identity and Diversity of *De corpore*, Hobbes again makes the point that how an object is identified over time depends on the way it is described. And as before, he holds that objects can be described as having a certain matter, a certain form, or a certain accident.

However, whereas in *De Mundo Examined* Hobbes had claimed that to describe an object as a ship is to describe it as having a certain form, he now denies that form is a suitable principle of individuation for ships. His argument is as follows:

On the second view two simultaneous bodies would be one and the same in number. For if a ship, say the ship of Theseus..., were one and the same after all of its original planks had been replaced, and if someone collected the old planks that were removed to reassemble them again in the same order, there is no doubt that this would be the same ship in number as the original ship, and we would have two ships the same in number, which is most absurd (*DC* 11.7).

Some commentators appear to read Hobbes as offering an argument along the following lines here<sup>31</sup>:

1. Suppose sameness of form suffices for sameness of ship.
2. Replacement and Reassembly have the same form.
3. Replacement and Reassembly are the same ship.
4. We have a bilocated ship, which is impossible.
5. Sameness of form does not suffice for sameness of ship.

But we submit that this would be a problematic argument for Hobbes to make. To see why, we need to turn to the two notions of form Hobbes offers in *De corpore*.



On the first notion of form found in that work, the form of an object is that accident on the basis of which we classify it as a member of a certain kind.<sup>32</sup> Given this notion of form, premise (2) of the argument comes out true. Replacement and Reassembly are both shaped in such a way that we classify them as ships of a certain kind. With form so construed, however, (1) would make so little sense that it becomes hard to see why Hobbes would even bother to target it for reduction. Surely nobody ever believed that sameness of kind sufficed for sameness in number.

To be sure, one could argue that, because their shapes are realized in the same matter, Original and Reassembly have the same individual shape that makes them ships of a certain kind, and hence the same individual form.<sup>33</sup> Now if sameness of individual form so construed is intended, (1) may well come out true. However, premise (2) of the argument would then come out false, as we have been given no reason to believe that Replacement and Reassembly, whose shapes are realized in different portions of matter, share the same individual form so understood.

The second notion of form in *De corpore* is introduced in the following passage from the chapter on identity and diversity:

If a name is imposed on the basis of such a form as is a principle of motion, the same individual will persist for as long as this principle remains. Thus a man whose actions and thoughts derive from the same principle, the principle that was in his generation, will remain the same man, a river that flows from one and the same source will remain the same river, whether the same water, other water, or something other than water flows from it, and a city whose acts continuously derive from one and the same institution will remain the same city (*DC* 11.7).

We are not given an official definition here, but the suggestion we get is that individuals *x* and *y* will share the same form only if they develop continuously from the same origin.<sup>34</sup> Given this concept of sameness of form, it appears that premise (2) of the argument would be false. Given this concept of sameness of form, it appears that Replacement and Reassembly would share the same form only if both of them had developed continuously from Original. Now, Replacement may well have so developed.<sup>35</sup> But it is hard to see how the same could be true for Reassembly.

So how should we read the argument? We propose the following. As we will see in a moment, as was the case in Passage 2 above, sameness of matter configured ship-wise suffices for sameness of ship. Hence, Reassembly is the same ship as Original. Now, it seems that Replacement could well have developed continuously from Original. Hence, if we allow that sameness of form also suffices for sameness of ship, it seems that Replacement could also be the same ship as Original. This would give us a bilocated ship. Hence, we must not allow that sameness of form suffices for sameness of ship.

But if ships are not individuated by form, how are they individuated? In *De Corpore*, Hobbes settles on criterion B. An object described as a

ship is a portion of matter with a certain figure, and it remains the same over time for as long as it remains the same portion of matter and retains that figure:

If a name is imposed on the basis of some accident, identity will depend on the identity of its matter, because as matter is lost and gained, accidents cease to exist and numerically different ones are generated. Thus the word 'ship', which signifies matter shaped in a certain way, is such that a ship will be the same if all of its matter is the same (*DC* 11.7).

The downside of opting for B, of course, is that the identity over time of artefacts like ships becomes rather ephemeral. Gone but one material part, gone too is the artefact. To mitigate this outcome, Hobbes in *De Corpore* makes a point that was absent from his earlier discussion with White, namely, that sameness and difference may come in degrees. The replacement of one or more planks does not yield an object that is different from Original simpliciter, but rather an object that is partially different from Original, partially the same:

If no part of the matter is the same, the ship will be numerically diverse entirely. If, however, a part of the matter remains and a part is lost, it will be a ship that is partially the same, partially different (*DC* 11.7).<sup>36</sup>

The upside of opting for B is that, even though this no longer is the focus in *De corpore*, it enables a consistent example of a ship that goes out of existence and then comes back into being again. As we have already seen, Hobbes believes that when a ship is taken apart, it ceases to be a ship. But per criterion B, when the same matter is reassembled the same way, what results will be the same body as well as the same ship in number as the one that had gone out of existence before. There is no need to worry about bilocation. Given that ships are individuated not by form but by sameness of suitably arranged matter, Replacement will neither be the same body nor the same ship as Original.

But even if Hobbes can consistently use the case of Original and Reassembly as an example of an individual capable of going out of being and then coming back into being again, is it an example White would need to accept?

## 7. *Hobbes and White*

The fact that Hobbes chooses to use an artefact to illustrate the possibility of an individual going out of being and then coming back into being again poses a first problem. For an Aristotelian such as White, it is not at all clear that nature and art are on a par the way they are for a

mechanist such as Hobbes, and it is not clear what an analysis of the products of art can teach us about the products of nature. It may well be true that disassembling and then reassembling them again can cause certain artefacts to go out of being<sup>37</sup> and then come back into being again. But it is not clear how this would be evidence that products of nature are likewise capable of going out of being and then coming back into being again after a while.

Moreover, and apart from any particular choice of example, we have seen that, according to White, individuals depend on their complete causal histories and that these histories include the complete state of the world the moment they are produced, or all of the circumstances under which they come into being. But the circumstances under which Original came into being are not the same as the circumstances under which Reassembly came into being. Hence, Original and Reassembly are not the same individual. Hence, the case of Original and Reassembly is not a case of the same individual coming into being more than once. Hobbes, it appears, has missed the point of the causal argument in White.

Hobbes was of course aware that White had claimed that individuals depend on a 'mathematical unity of circumstances'.<sup>38</sup> But Hobbes rejected this claim, reasoning as follows. At no two moments are circumstances the same. Hence, if individuals depend on circumstances, no individual will last longer than a moment. Because this is absurd, the claim that individuals depend on circumstances is false:

It could be said that, when someone has committed a homicide or a theft, the man who is punished is not the same individual, but someone else similar to him. This is to confuse all human laws and offices, but these and innumerable other absurdities haunt those who believe the individuality or numerical unity of a thing to depend on the unity of accidental circumstances (*DME* 191–192).

The reference to 'accidental' circumstances at the end of this passage is significant. Indeed, Hobbes thinks that the position that individuals depend on circumstances is just as problematic as the position that objects are individuated by the total sum of their accidents. Just as the accidents account of individuation entails that no individual will survive the loss of even the most insignificant feature, the dependence of individuals on circumstances entails that no individual will survive even the smallest change in circumstances. On some occasions, Hobbes even goes so far as to claim that making individual dependent on circumstances just is to commit to individuation by accidents, telling his readers that White is 'among those' who defend the view that objects are individuated by the total sum of their accidents at any given moment (*DME* 189).<sup>39</sup>

This, however, is unfair to White. What White has claimed is that no individual can be produced under other circumstances than those under which it

is in fact produced. He has not claimed that individuals last for only as long as these circumstances do. But even if Hobbes in the passage cited above may not be entirely fair to White, he does draw attention to an important question that White has so far remained silent about. This is the question of what changes an individual substance will, and what changes it will not, survive. We do not know what kind of access White had to Hobbes's treatise in the years immediately following upon its completion. What we do know however is that in his *Institutiones peripateticae* White included a chapter on just this question, in which he set out to identify the persistence conditions of material substances, and to clarify what changes material substances will and will not survive.

### 7.1. WHITE ON IDENTITY OVER TIME

In the first sentence of this chapter, White points out that not every change amounts to a substantial change. Material substances retain an identity over time as they undergo accidental change:

It is evident from what has been said that when an accident of a thing is changed, this does not amount to a change in its individuality (*IP* 215).<sup>40</sup>

So in virtue of what is it that material substances retain an identity over time? According to White, the answer to this question depends on the kind of material substance or body we are speaking of. In the course of the chapter, he identifies three kinds of material substances: homogeneous portions of one of the four elements, nonliving mixtures of two or more elements, and living organic bodies.

According to White, a homogeneous portion of one earth, water, fire, or air persists for as long as it remains undivided and no new matter is added to it. The loss or gain of even the smallest material part, however, will cause it to become a new individual:

It is clear that mere division changes the individuality of an element, so that when a part, no matter how small, is taken away or added, its individuality is changed (*IP* 216).

Something similar holds true for nonliving mixtures of two or more elements. A piece of bronze will remain a specimen of bronze for as long as the combination of elements that defines bronze remains intact. It will remain the same individual specimen of bronze as long as it remains the same mass of bronze:

The case of mixtures is in part the same and in part different from that of the elements. For if the heterogeneous parts that essentially constitute a mixture are dissolved, this will change the kind to which it belongs, rather than its individuality. If, however, a part of the same kind is either added or removed, its individuality will be taken to have changed (*IP* 216).

Contrary to elements and nonliving mixtures, living animal bodies do survive the loss and gain of parts, as long as they continue to strive for the preservation of their own lives:

An animal does not undergo substantial change for as long as the love for the preservation of itself remains in it (*IP* 219).

Cats survive the loss of their tails.<sup>41</sup>

In his *Institutiones peripateticae* then, White makes an attempt to clarify the conditions under which temporally distant individuals can be said to be the same. In closing, however, we point out that some problems remain. First, the claim that animals survive what White (in *IP* 219) calls the cutting off of members raises some familiar issues. Suppose a worm is cut into halves, both of which continue to live. Do we have two new worms here, or does one of them count as a continuation of the worm before it was segmented? And if so, which of the two worms continues the love for the preservation of itself of the initial worm? As far as we can tell, White provides no discussion of this and related puzzles.

Second, what the account of animal identity over time we have been offered so far tells us is that, given two temporally distant animals *a* and *b*,

*a* will be the same individual as *b* only if the love for self-preservation of *a* is the love for self-preservation of *b*.

But this claim immediately raises the question of what individuates these self-loves, or what it is that makes a given self-love the individual it is. White does not tell us, but it would appear that part of what makes a self-love the individual it is, is the self whose love it is. Hence:

The love for self-preservation of *a* is the love for self-preservation of *b* only if *a* is the same individual as *b*.

But jointly, the above two claims bring us back to the initial problem, of accounting for the identity of temporally distant animals *a* and *b*.<sup>42</sup>

## 8. Conclusion

Is it possible for one and the same individual to come into being more than once? In his dialogues *De mundo*, Thomas White argued that effects necessarily depend on their causal pedigrees and claimed that any two temporally distant effects would have different causal pedigrees. Hence, no effect produced now can be the same as an object produced earlier. According to Hobbes, however, a version of the ancient puzzle of the Ship

of Theseus can be used to show that it is possible for some individuals to cease to be at one moment of time and then to come back into being again at a later moment. We have argued that, at least in *De Mundo Examined*, the discussion of the Ship of Theseus suffers from an internal tension and that Hobbes to some degree misrepresents White's position. Even so, Hobbes's criticism may have prompted White to clarify his views on the identity of temporally distant individuals in his later *Institutiones peripateticae*.

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#### NOTES

<sup>1</sup> On White (1593–1576) and his intellectual context, see Tutino (2008).

<sup>2</sup> For discussion, see Krook (1993) and Southgate (1993), also Connolly (2018) and Adriaenssen (2021).

<sup>3</sup> On the title Hobbes may have intended for the treatise, also sometimes known as the *Anti-White*, see Malcolm (2011).

<sup>4</sup> An effect for White is any event, substance, or accident produced by one or more causal agents.

<sup>5</sup> In 1643, Mersenne was in possession of a manuscript of *De Mundo Examined*. According to Jacquot and Jones, it is likely that it would have been known to mutual Parisian friends of Hobbes and Mersenne such as Pierre Gassendi, Pierre Martel, and Abraham du Prat. White was associated to the Mersenne circle of intellectuals throughout the 1640s, but we cannot be certain what kind of access he would have had to the manuscript in the years following immediately upon its completion. See Jacquot and Jones in Hobbes (1973, p. 45). On White's association with the Mersenne circle, see Southgate (1993, pp. 28–29). We know that, by 1655, White had returned to England, where he and Hobbes became close friends. It is likely that he would have learned of Hobbes's criticisms of *De mundo* during their encounters in London.

<sup>6</sup> From now onwards, we will use the following abbreviations:

*DC* (followed by chapter and paragraph number): Hobbes (1999).

*DM* (followed by page number): White (1642).

*DME* (followed by page number): Hobbes (1973).

*IP* (followed by page number): White (1646).

Unless stated otherwise, translations are ours.

<sup>7</sup> As commentators have pointed out, the dialogues *De mundo* were modelled after Galileo's better known *Dialogo sopra i due massimi sistemi del mondo* of 1632, which had pitted the Aristotelianism of Simplicius against the modern physics of Salviati, Sagredo being an informed layman ready to be convinced by Salviati. See Jacquot and Jones in *DME* 13.

<sup>8</sup> According to Harold Jones, Asphalius mistakenly claims here that in any given cast, the probability of success will be lower than in the previous cast (in Hobbes 1976, p. 144). It is hard to see, however, how the passage suggests this reading.

<sup>9</sup> It does not seem plausible that Asphalius or White would have been able to calculate these probabilities for all values of  $n$ . In his *Liber de ludo alae*, written around 1564, Girolamo Cardano had shown that, given a probability  $p$  of success in a single cast of a set of dice, the probability of obtaining more than one success in two casts of the same set of dice is  $p^2$ . On Cardano, see Ore (1953), in particular chapter 5.

<sup>10</sup> See *DM* 112 and Section 3 below.

<sup>11</sup> Asphalius refers back to this infinity in *DM* 110–111.

<sup>12</sup> See *IP* 187–195. On the potential parts theory in his friend and philosophical ally, Kenelm Digby, see Pasnau (2011, pp. 621–623) and Pécharman (2020).

<sup>13</sup> The actuality of infinitely improbable events such as my life taking the course it does rather than any other, or a fair spinner stopping at some one angle rather than any other, has generated some discussion in contemporary philosophy. Does the actuality of such events mean that infinitely small chances are somehow larger than zero, or rather that events with zero probability can and do happen? See, for example, Lewis (1983, pp. 175–176) and Hofweber (2014).

<sup>14</sup> At one point, Asphalius gives the following example. When a player obtains success in a game of dice two times in a row, the causal series leading to the first success includes a decision to roll the dice, which in turn may be caused by a desire to obtain success. But the causal series leading to the second success will include a decision to roll the dice *again*, perhaps caused by a desire to obtain success *again*. Thus the causal series leading to the two successes differ, causing them to be the same effects in kind, but not in number (*DM* 110). More is needed, however, to arrive at the general conclusion that, for any  $e$ , no effect coming after  $e$  will be produced by the same causal series as it.

<sup>15</sup> Even if not in all. Ten years before *De mundo* was published, the influential Spanish Jesuit, Rodrigo de Arriaga, had noted that he could see no reason why numerically the same hotness that happens to be produced by a fire could not have been produced by the sun (1632, p. 829).

<sup>16</sup> As an anonymous referee points out, Hobbes too in some places seems to accept that the causes of an effect are necessary and sufficient for it. See, for instance, Hobbes (2000, pp. 20–21).

<sup>17</sup> In the early sixteenth century, Pietro Pomponazzi argued against Paul of Venice and Gregory of Rimini that individuals necessarily have the material, causal, and temporal origins they do. Socrates, according to Pomponazzi, was necessarily generated from the blood of Phenarete as a material cause, from Sophroniscus as an efficient cause, and could not have been generated at another time than he in fact was. See Pomponazzi (1525, pp. 131–32). For discussion, see Adriaenssen (forthcoming).

<sup>18</sup> See *DME* 189. For discussion, see Leijenhorst (2002, pp. 166–68) and Pasnau (2011, p. 706).

<sup>19</sup> For Hobbes, a part of a body is any region of the body that can be divided from the others by the mind. Before it is divided along certain lines by the mind, a body is best understood as having potential parts only. For the mind to divide a body along certain lines is for it to actualize some of these potential parts. As Thomas Holden notes, this version of the potential parts theory differs from the version in authors such as White and Digby. For them, physical division, not mental division, is the process that actualizes parts. See Holden (2004, pp. 96–99).

<sup>20</sup> Hobbes does not elaborate on his concept of parthood here, but presumably part of what he means is that  $x$  and  $y$  are the same if and only if they are divisible by the mind into the exact same regions or parts.

<sup>21</sup> Note that Hobbes in this passage commits to the reality of scattered bodies or bodies with spatially non-contiguous parts.

<sup>22</sup> In *DC* 8.2, Hobbes defines accidents as ways in which objects appear to us. There is some debate about what this means for the ontological status of accidents. According to Pasnau (2011, p. 649), it means that all accidents are mind-dependent. According to Leijenhorst (2002, p. 157), the ways in which a body appears to us are caused by the mind-independent accidents of motion and magnitude.



<sup>23</sup> As commentators have noted, Hobbes's position here entails that a river going dry in one season and then running again in a next is not properly speaking one individual river. See Pasnau (2011, p. 708). Also Normore and Brown (2014, p. 43).

<sup>24</sup> Hobbes uses the word *tabula*. As far as we can see, *tabula* in Hobbes is not intended to serve as a technical term but can refer to any kind of plank used in the construction of the ship.

<sup>25</sup> We borrow this nomenclature from Gallois (2017, p. 6).

<sup>26</sup> For a clear statement of this reading, see Pécharman (1995, pp. 213–214). According to Gallois (2017, p. 45) Hobbes 'foreshadowed' the modern relative identity thesis.

<sup>27</sup> Hobbes sometimes suggests that an old man may be the same man as a young man, although not the same body. See, for instance, *DME* 190–191.

<sup>28</sup> See, for instance, Pécharman (1995, pp. 215–216).

<sup>29</sup> Normore and Brown read the passage as saying that the moment a single plank is replaced, 'a different form is imposed on different material and one does not have the same ship' (2014, p. 42). But this reading seems problematic. All Hobbes claims in this passage is that if a ship loses a part that is essential for its ability to sail, it will cease to be a ship for as long as it lacks a part of this kind and will forever cease to be this individual ship. Hull planks may be parts of this kind. But even if some planks may be parts of this kind, not all planks will be.

<sup>30</sup> This will of course depend on exactly how the rudder is partitioned. If it is divided into very small parts, it seems the rudder could easily be replaced part by part without Original ever losing a rudder. If, however, it is divided into one very small part and one more or less rudder-sized part, the same would perhaps not be true. Given Hobbes's account of parts, whereby a part is any region of an object that can be isolated in mental representation, it seems that both procedures would count as replacing the rudder part by part. Thus, there would seem to be at least one way of dividing the rudder part by part such that Original never loses a rudder in the process.

<sup>31</sup> Zarka (1996, p. 72) writes that, if ships were individuated by form, 'two identical ships with interchangeable parts could not be counted as two, but only as the same ship'. This suggests he takes the problem to arise from (2).

<sup>32</sup> See *DC* 8.23. On this notion of form in Hobbes, see Leijenhorst (2002, pp. 163–65).

<sup>33</sup> According to Leijenhorst (2002, p. 168), Original and Reassembly are 'formally identical'.

<sup>34</sup> Around a decade before the publication of *De corpore*, Hobbes's friend and correspondent, Kenelm Digby, had construed sameness of form in terms of sameness of origin as well:

Let us consider then how that which giveth the numerical individuation to a Body, is the substantiall forme. As long as that remaineth the same, though the matter be in continuall fluxe and motion, yet the thing is still the same. There is not one droppe of the same water water in the Thames that ranne downe by Whitehall yesternight, yet no man will deny, but that it is the same river that was in Queene Elizabeths time, as long as it is supplied from the same Common Stocke, the Sea (1643, pp. 82–83).

Indeed, according to Seth Ward, Hobbes was indebted to Digby for his account of form in the *De corpore* chapter on identity and diversity. See Ward (1656, p. 99). On Digby on form as a guarantor of identity over time, see Adriaenssen and de Boer (2019).

<sup>35</sup> In *De corpore*, there is no hint at a temporary loss of ship abilities on the way from Original to Replacement.

<sup>36</sup> Thus, it appears that B in the chapter on identity and diversity is understood as the claim that, in order for a given individual *x* endowed with some given accident F to be identical with *y* in its entirety, it is necessary and sufficient that the matter of *y* be the matter of *x* and that it realize F.



<sup>37</sup> Although not all artefacts, ships may not survive dissembling. The very point of flat pack furniture is that it does.

<sup>38</sup> He cites this claim in *DME* 191.

<sup>39</sup> His modern commentators have tended to follow Hobbes in reading White this way. See, for example, Leijenhorst (2002, p. 167), and Normore and Brown (2014, p. 41).

<sup>40</sup> The chapter on individual change can be found on pp. 219–225 of the 1656 English translation of *IP*.

<sup>41</sup> The converse does not hold, however. According to White, once a member is divided from the organism whose member it was, the member will cease to be what it was. A tail ceases to be a tail the moment it is divided from the cat whose tail it was. See *IP* 207.

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